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HENSON, MISCHITA L	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No. 10/591,701	Applicant(s) LERCHE ET AL.	
	Examiner MI'SCHITA' HENSON	Art Unit 2857	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 April 2011*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

5)☒ Claim(s) *1-17,19-26 and 28-35* is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6)☐ Claim(s) _____ is/are allowed.

7)☒ Claim(s) *1-17,19-26 and 28-35* is/are rejected.

8)☐ Claim(s) _____ is/are objected to.

9)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☒ The drawing(s) filed on *09 July 2007* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

12)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

This action is in response to the July 14, 2011 Pre-Appeal Brief Review Panel Decision. Claims 1, 4, 10-14, 16, 19 and 34 have been amended. Claims 1-17, 19-26 and 28-35 are pending.

Response to Arguments

1. Applicant's arguments with respect to claims 1-17, 19-26 and 28-35 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

2. **Claims 1-10, 17, 21-25 and 28** are rejected under 35 U.S.C. 101 because the claimed invention is neither tied to a machine or apparatus, nor does it perform a transformation. As currently presented, the method steps in claims 1-10, 17, 21-26 and 28 need not be performed by a specific machine.

Based on recent Court decisions, it has been held that a §101 process must (1) be tied to another statutory class (a particular machine or apparatus) or (2) transform underlying subject matter (such as an article or materials) to a different state or thing. Thus, to qualify as a §101 statutory process, the claim should positively recite the other statutory class (the thing or product) to which it is tied, for example, by ***identifying the apparatus that <u>accomplishes</u> the method steps***, or positively recite the subject matter that is being transformed, for example, by identifying the material that is being changed to a different state. *Applicant's recitation of a "measurement device" in the*

preamble is only present as a field-of-use-limitation and thus does not impose a meaningful limit on the claim's scope and provides nothing more than insignificant "extra-solution" activity. I.e. the steps of determining, recording and calculating do not necessarily require the use of the "measurement device" .

As such, claim 1 only recites a method that includes steps that could be purely mental and the claim does not in any way tie the process to another statutory class nor does the claim transform an article to a different state or thing. Such claims are therefore non-statutory under 35 U.S.C. 101.

Claims 2-10, 17, 21-26 and 28 do not remedy the deficiencies of the claims from which they depend, with respect to 35 U.S.C. 101.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. **Claims 11, 14 and 29-30** are rejected under 35 U.S.C. 102(b) as being anticipated by Lerche in WO 97/16713 A2 (see machine translation of corresponding patent family document DE 19542225 A1 for understanding).

Regarding **claim 11**, Lerche teaches:

a sample receptacle unit (see "…ein koaxiales Zylindermeβsystem…in dessen Kammer…die Kammer…", page 1 lines 28-36 and Fig. 1 column 1 (i.e. coaxial cylinder

measuring system, chamber); see also page 7 lines 1-5 (i.e. measured sample placed in a measuring vessel)); and

a spectrometric measurement device (see “Photometer”, page 2 lines 22 and Fig. 1 column 1) with a source producing monochromatic parallel radiation (see “Lichtransmissinoszunahme….Danach wird im Durchlicht-Hellfeld der Leuchtdichteverlauf…”, page 2 lines 19-30 (i.e. light transmission, transmitted light field) and Fig. 1 column 1 (e.g. Lichtquelle is a light source)), which measures radiation intensity scattered or transmitted by a dispersion sample (see “Danach wird im Durchlicht-Hellfeld der Leuchtdichteverlauf von Suspension- und Emulsionsproben auf einem Bildaufnehmer abgebildet un rechentechnisch aufbereitet…”, page 2 lines 19-30 and Fig. 1 column 1 (i.e. luminance curve of suspension and emulsion sample is imaged onto an image recorder and processed)) over the a partial or entire length of the sample (see page 5 lines 23-28 and Fig. 1 column 1 (i.e. recorded over a length measurement)), simultaneously for multiple positions of the sample (see “…von der radialen Position registriert”, page 7 lines 3-8 and Fig. 1 column 1 (i.e. function of radial position)), and provides a radiation intensity measurement for each of the multiple positions at which a measurement is taken (see “Danach wird im Durchlicht-Hellfeld der Leuchtdichteverlauf von Suspension- und Emulsionsproben auf einem Bildaufnehmer abgebildet un rechentechnisch aufbereitet…”, page 2 lines 19-30 and Fig. 1 column 1 (i.e. luminance curve of suspension and emulsion sample is imaged onto an image reorder and processed)).

Regarding **claim 14**, Lerche teaches the limitations of claim 11 as indicated above. Further, Lerche teaches comprising a thermostat for controlling a measurement range and carrying out measurements at selectable temperatures both under as well as over room temperature (see "...der gesamten Messung die Temperatur registriert und in die Auswertungsschritte eingerechnet warden", page 8 lines 25-32; see also a temperature control, page 5 of translation; see also LUMiFuge, page 9 and Fig. 1 column 1 (i.e. LUMiFuge has integrated temperature control from 4-60℃)).

Regarding **claim 29**, Lerche teaches:

radiating the sample with waves having intensity values I_o (t, r) (see "Lichtransmissinoszunahme….Danach wird im Durchlicht-Hellfeld der Leuchtdichteverlauf…", page 2 lines 19-30 (i.e. light transmission, transmitted light field) and Fig. 1 column 1 (e.g. Lichtquelle is a light source)) at multiple positions r of the sample at a time t (see "…von der radialen Position registriert", page 7 lines 3-8 and Fig. 1 column 1 (i.e. function of radial position));

during segregation of the sample (see "…eines Probekörpers in einem zu untersuchenden Medium unter der Einwirkung von Zentrifugalkräften haervorgrufen…", page 5 lines 34-37 and Fig. 1 column 1 (i.e. centrifugal segregation)), detecting transmission values I_T(t, r) and/or scattering values I_S(t, r) of the sample (see "Danach wird im Durchlicht-Hellfeld der Leuchtdichteverlauf von Suspension- und Emulsionsproben auf einem Bildaufnehmer abgebildet un rechentechnisch aufbereitet…", page 2 lines 19-30 and Fig. 1 column 1 (i.e. luminance curve of suspension and emulsion sample is imaged onto an image recorder and processed)),

simultaneously for multiple positions r (see "…von der radialen Position registriert", page 7 lines 3-8 and Fig. 1 column 1 (i.e. function of radial position)); and

characterizing a segregation status from the transmission values $I_T(t, r)$ and/or scattering values $I_s(t, r)$ (see Fig. 1; see also pages 4-5 of translation).

Regarding **claim 30**, Lerche teaches the limitations of claim 29 as indicated above. Further, Lerche teaches recording the transmission values $I_T(t, r)$ and/or scattering values $I_s(t, r)$ (see "Danach wird im Durchlicht-Hellfeld der Leuchtdichteverlauf von Suspension- und Emulsionsproben auf einem Bildaufnehmer abgebildet un rechentechnisch aufbereitet…", page 2 lines 19-30 and Fig. 1 column 1 (i.e. luminance curve of suspension and emulsion sample is imaged onto an image recorder and processed)).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. **Claim 12** is rejected under 35 U.S.C. 103(a) as being unpatentable over Lerche in WO 97/16713 A2 (see machine translation of corresponding patent family document DE 19542225 A1 for understanding) as applied to claim 11 above, and further in view of Applicant Admitted Prior Art (AAPA) and Rolfo-Fontana in US Patent 3,932,131.

Regarding **claim 12**, Lerche teaches the limitations of claim 11 as indicated above. Further, Lerche teaches LUMiFuge (see page 9 and Fig. 1 column 1 (LUMiFuge

works with SEPView, a databased software)) and cuvettes (see “Küvettenrotorsystem”, page 2 lines 20-22 and page 5 of translation). Lerche differs from the claimed invention in that it may not explicitly teach a database or the sample receptacle unit comprises different cuvettes matched to the measurement task. Applicant Admitted Prior Art admits that to store measurement results in a database is well known in the art (see un-traversed Official Notice in Office Action mailed 3/16/2010) and thus it was within the ordinary ability of one of ordinary skill in the art. Therefore it would have been obvious to one of ordinary skill in the art to modify Lerche to store measurement results in a database in order to make them available for a calculation or future reference, thereby improving the functionality of the system.

Rolfo-Fontana teaches a method for simultaneous performance of a number of analyses (column 1 lines 8-12) using methods such a spectrophotometric methods (column 1 lines 50-55) comprising a number of cuvettes for different kinds of analysis and having different measurement tasks (i.e. the sample receptacle unit comprises different cuvettes matched to the measurement task, column 3 lines 25-64 and Figs. 2-4).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have combined the teachings of Rolfo-Fontana and AAPA with Lerche because Rolfo-Fontana teaches a method for simultaneous performance of a number of analyses of a plurality of sample types (column 1 lines 8-12), thereby improving the efficiency and functionality of the system.

7. **Claim 13** is rejected under 35 U.S.C. 103(a) as being unpatentable over Lerche in WO 97/16713 A2 (see machine translation of corresponding patent family document DE 19542225 A1 for understanding) as applied to claim 11 above, in view of Alsmeyer et al. in US Patent 5,638,172.

Regarding **claim 13**, Lerche teaches the limitations of claim 11 as indicated above. Further, Lerche teaches a plurality of radiation sources (see LUMiFuge, page 9 and Fig. 1 column 1). Lerche differs from the claimed invention in that it may not explicitly teach radiation sources of different monochromatic wavelengths, whose radiation intensity $I_o(t, r)$ can be varied, are used depending on the sample and measurement tasks.

Alsmeyer et al. teaches a sample receptacle unit (see sample container, column 2 lines 51-52), and a spectrometric measurement device (see “Spectrophotometric apparatus…and radiation source”, column 1 line 55-56 and column 5 lines 9-15) with a source producing monochromatic parallel radiation (see "monochromatic radiation source”, column 3 lines 34-35 and column 5 lines 16-18), which measures radiation intensity scattered or transmitted by a dispersion sample (see “a means of collecting scattered radiation…a means of…dispersion, of the scattered radiation…”, column 5 lines 9-15) wherein the source producing monochromatic parallel radiation comprises a plurality of radiation sources of different monochromatic wavelengths, whose radiation intensity $I_o(t, r)$ can be varied, are used depending on the sample and measurement tasks (see “diode lasers capable of performing at various incident wavelengths are commercially available”, column 6 lines 45-59; see also “There are various classes of

laser radiation sources…", column 5 lines 23-28; see also "multi-mode diode laser", claim 4). This method of varying radiation intensity with a plurality of monochromatic radiation sources was within the ordinary ability of one of ordinary skill in the art based upon the teachings of Alsmeyer et al.

Therefore it would have been obvious to one of ordinary skill in the art to combine the teachings of Alsmeyer et al. with Lerche to obtain the claimed invention and the results would have been predictable.

8. **Claims 15-16** are rejected under 35 U.S.C. 103(a) as being unpatentable over Lerche in WO 97/16713 A2 (see machine translation of corresponding patent family document DE 19542225 A1 for understanding) as applied to claim 11 above, in view of Allen in US Patent 5,095,451.

Regarding **claim 15**, Lerche teaches the limitations of claim 11 as indicated above. Further, Lerche teaches a plurality of radiation sources (see LUMiFuge, page 9 and Fig. 1 column 1) and a motor driven rotor system (see "Ein motorgetriebenes Küvettenrotorsystem mit einem gegenüber dem Rotor…", page 2 lines 20-22 . Lerche differs from the claimed invention in that it may not explicitly teach a multi-sample receptacle unit.

Allen teaches a method and apparatus for determining particle size distributions of particular samples by measuring particle concentration as a function of time and position (Abstract and column 2 lines 37-47) comprising a multi-sample receptacle unit designed as a rotor (see "a settling tank…is capable of being rotated in order to induce a centrifugal force field, column 2 lines 60-62), and is driven by a motor (see motor,

column 8 lines 50-53 and Fig. 2; see also stepper motor, column 12 line 31) with programmable variable and/or constant revolutions.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have combined the teachings of Allen with Lerche because Allen teaches a method of reducing the time required in determining particle size distribution (column 2 lines 37-47), thereby improving the functionality of the system.

Regarding **claim 16,** Lerche and Allen teach the limitations of claim 15 as indicated above. Further, Allen teaches the multi-sample receptacle is capable of accepting samples placed vertically for segregation in a gravitational field (see tank, horizontally and vertically, column 8 line 65 - column 9 line 10 and Figs. 1 and 4).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have combined the teachings of Allen with Lerche because Allen teaches a method of reducing the time required in determining particle size distribution (column 2 lines 37-47), thereby improving the functionality of the system.

9. **Claims 1-9, 17, 19-26 and 28** are rejected under 35 U.S.C. 103(a) as being unpatentable over Lerche in WO 97/16713 A2 (see machine translation of corresponding patent family document DE 19542225 A1 for understanding) as applied to claim 29 above, and further in view of Wegstedt in US Patent 3,997,845.

Regarding **claim 1**, Lerche teaches:

(a) repeatedly determining momentary transmission values $I_T(t, r)$ and optionally scattering values $I_s(t, r)$ using waves radiated with intensity values $I_o(t, r)$ (see “Danach wird im Durchlicht-Hellfeld der Leuchtdichteverlauf von Suspension- und

Emulsionsproben auf einem Bildaufnehmer abgebildet un rechentechnisch aufbereitet…", page 2 lines 19-30 and Fig. 1 column 1 (i.e. luminance curve of suspension and emulsion sample is imaged onto an image recorder and processed)), characterizing a segregation status from the transmission values $I_T(t, r)$ and/or scattering values $I_s(t, r)$ (see Fig. 1; see also pages 4-5 of translation) as a function of a position r within the sample at a time t (see "…von der radialen Position registriert", page 7 lines 3-8 and Fig. 1 columns 1-3 (i.e. function of radial position and time)), for one or more wavelengths over at least a partial section of the sample ((see page 5 lines 23-28 and Fig. 1 column 1 (i.e. recorded over a length measurement)), simultaneously for multiple positions r (see "…von der radialen Position registriert", page 7 lines 3-8 and Fig. 1 column 1 (i.e. function of radial position)).

Further, Lerche teaches calculating multiple extinction profiles and segregation speeds (see varying acceleration, time-dependent position of the specimen and time-dependent changes in acceleration change in the position of the specimen, pages 2-8 and Fig. 1), determination of a particle or droplet concentration for the dispersion sample as a function of the sample position and time (pages 2-8 and Fig. 1; see also LUMiFuge, page 9 and Fig. 1 column 1) and LUMiFuge (see LUMiFuge, page 9 and Fig. 1 column 1(i.e. LUMiFuge calculate a polydispersity index)).

Lerche differs from the claimed invention in that it may not explicitly teach calculating an extinction profile by finding a log of a ratio of $I_O(t, r)/ I_T(t, r)$.

Wedgstedt "Thus, within the measuring technique, it occurs in many cases that an analog electric measuring signal is produced, which is not directly linearly

proportional to the value of the measured quantity. In such a case one wishes often to modify this measuring signal, before it is supplied to a recording or indicating instrument, in such a way that the signal supplied to the instrument is directly linearly proportional to the value of the measured quantity, whereby an instrument with a "linear" scale can be used. In other connections it may be desired to obtain a signal which is a predetermined exponential function of an already existing signal. This is the case, for instance, in connection with photometric measurements of the concentration of a given substance in a liquid sample. For such a photometric concentration measurement a beam of radiation of a predetermined wavelength is sent through the sample and the intensity of the radiation leaving the sample, the so called transmission, is measured by means of a radiation sensitive element, as for instance a photo diode. However, this measurement result, that is the transmission, is not directly linearly proportional to the concentration of the substance in the sample. Instead it is ***the so called extinction, that is the logarithm of the ratio between the intensity of the radiation leaving the sample and the intensity of the radiation entering the sample, which theoretically is linearly proportional to the concentration in the sample***. However, this is true only in the ideal case, and in reality the non-linear relation between the transmission measured by the radiation sensitive element and the concentration in the sample depends on the substance for which the concentration is measured and also on the wavelength being used. Of course, the relation is also effected by any unlinearity of the radiation sensitive element being used" (i.e. calculating an extinction profile by finding a log of a ratio of $I_O(t, r)$/ $I_T(t, r)$, emphasis added, column

1 lines 12-45). This method of calculating an extinction profile by finding a log of a ratio of $I_O(t, r)/ I_T(t, r)$ was known and within the ordinary ability of one of ordinary skill in the art based upon the teachings of Wegstedt.

Therefore it would have been obvious to one of ordinary skill in the art to combine the teachings of Wegstedt with Lerche to obtain the claimed invention and the results would have been predictable.

Regarding **claim 2,** Lerche and Wegstedt teach the limitations of claim 1 as indicated above. Further, Lerche teaches wherein the particle or droplet sizes and their distribution are determined (see “Rohstoffe bezüglich ihrer Partikelanzahl, der Partikelgrüβe under der Partikelgröβenverteilung….”, page 2 lines 35-37 and Fig. 1 (i.e. particle number, particle size and particle size distribution)).

Regarding **claim 3,** Lerche and Wegstedt teach the limitations of claim 2 as indicated above. Further, Lerche teaches wherein the particle or droplet distribution is calculated (see “Rohstoffe bezüglich ihrer Partikelanzahl, der Partikelgrüβe under der Partikelgröβenverteilung….”, page 2 lines 35-37 and Fig. 1 (i.e. particle number, particle size and particle size distribution)) and a freely selectable position (Fig. 1).

Lerche differs from the claimed invention in that it may not explicitly teach calculating an extinction profile.

Wedgstedt “Thus, within the measuring technique, it occurs in many cases that an analog electric measuring signal is produced, which is not directly linearly proportional to the value of the measured quantity. In such a case one wishes often to modify this measuring signal, before it is supplied to a recording or indicating

instrument, in such a way that the signal supplied to the instrument is directly linearly proportional to the value of the measured quantity, whereby an instrument with a "linear" scale can be used. In other connections it may be desired to obtain a signal which is a predetermined exponential function of an already existing signal. This is the case, for instance, in connection with photometric measurements of the concentration of a given substance in a liquid sample. For such a photometric concentration measurement a beam of radiation of a predetermined wavelength is sent through the sample and the intensity of the radiation leaving the sample, the so called transmission, is measured by means of a radiation sensitive element, as for instance a photo diode. However, this measurement result, that is the transmission, is not directly linearly proportional to the concentration of the substance in the sample. Instead it is ***the so called extinction, that is the logarithm of the ratio between the intensity of the radiation leaving the sample and the intensity of the radiation entering the sample, which theoretically is linearly proportional to the concentration in the sample***. However, this is true only in the ideal case, and in reality the non-linear relation between the transmission measured by the radiation sensitive element and the concentration in the sample depends on the substance for which the concentration is measured and also on the wavelength being used. Of course, the relation is also effected by any unlinearity of the radiation sensitive element being used" (i.e. emphasis added, column 1 lines 12-45). This method of calculating an extinction profile by finding a log of a ratio of $I_O(t, r)/ I_T(t, r)$ was known and within the ordinary ability of one of ordinary skill in the art based upon the teachings of Wegstedt.

Therefore it would have been obvious to one of ordinary skill in the art to combine the teachings of Wegstedt with Lerche to obtain the claimed invention and the results would have been predictable.

Regarding **claim 5,** Lerche and Wegstedt teach the limitations of claim 1 as indicated above. Further, Lerche teaches determining a sedimentation type and a critical concentration by volume from the change in the segregation speed during the segregation (see "…Sedimentation und Volumenkozentration gleichzeitig in einer Probe zu bestimmen…Rohstoffe bezüglich ihrer Partikelanzahl, der Partikelgrüβe under der Partikelgröβenverteilung….", page 2 lines 30-37 and Fig. 1 (i.e. concentration by volume and sedimentation, particle number, particle size and particle size distribution)).

Regarding **claim 6,** Lerche and Wegstedt teach the limitations of claim 1 as indicated above. Further, Lerche teaches wherein the ascertainable range of the distribution of sizes as well as the resolution with respect to the distribution of grain sizes can be increased by varying the number of revolutions and the measurement time intervals (page 1 line 5 to page 2 lines 37 and Fig. 1).

Regarding **claim 7,** Lerche and Wegstedt teach the limitations of claim 1 as indicated above. Further, Lerche teaches wherein a mass density distribution of the sample (see "Rohstoffe bezüglich ihrer Partikelanzahl, der Partikelgrüβe under der Partikelgröβenverteilung….", page 2 lines 35-37 and Fig. 1 (i.e. particle number, particle size and particle size distribution)). Lerche differs from the claimed invention in that it may not explicitly teach calculating an extinction profile.

Wedgstedt “Thus, within the measuring technique, it occurs in many cases that an analog electric measuring signal is produced, which is not directly linearly proportional to the value of the measured quantity. In such a case one wishes often to modify this measuring signal, before it is supplied to a recording or indicating instrument, in such a way that the signal supplied to the instrument is directly linearly proportional to the value of the measured quantity, whereby an instrument with a "linear" scale can be used. In other connections it may be desired to obtain a signal which is a predetermined exponential function of an already existing signal. This is the case, for instance, in connection with photometric measurements of the concentration of a given substance in a liquid sample. For such a photometric concentration measurement a beam of radiation of a predetermined wavelength is sent through the sample and the intensity of the radiation leaving the sample, the so called transmission, is measured by means of a radiation sensitive element, as for instance a photo diode. However, this measurement result, that is the transmission, is not directly linearly proportional to the concentration of the substance in the sample. Instead it is ***the so called extinction, that is the logarithm of the ratio between the intensity of the radiation leaving the sample and the intensity of the radiation entering the sample, which theoretically is linearly proportional to the concentration in the sample***. However, this is true only in the ideal case, and in reality the non-linear relation between the transmission measured by the radiation sensitive element and the concentration in the sample depends on the substance for which the concentration is measured and also on the wavelength being used. Of course, the relation is also

effected by any unlinearity of the radiation sensitive element being used” (i.e. emphasis added, column 1 lines 12-45). This method of calculating an extinction profile by finding a log of a ratio of $I_O(t, r)/ I_T(t, r)$ was known and within the ordinary ability of one of ordinary skill in the art based upon the teachings of Wegstedt.

Therefore it would have been obvious to one of ordinary skill in the art to combine the teachings of Wegstedt with Lerche to obtain the claimed invention and the results would have been predictable.

Regarding **claim 8,** Lerche and Wegstedt teach the limitations of claim 1 as indicated above. Further, Lerche teaches wherein different densities, the distribution of grain sizes for the individual substance component (see “Rohstoffe bezüglich ihrer Partikelanzahl, der Partikelgrüβe under der Partikelgröβenverteilung….”, page 2 lines 35-37 and Fig. 1 (i.e. particle number, particle size and particle size distribution)). Lerche differs from the claimed invention in that it may not explicitly teach calculating an extinction profile.

Wedgstedt “Thus, within the measuring technique, it occurs in many cases that an analog electric measuring signal is produced, which is not directly linearly proportional to the value of the measured quantity. In such a case one wishes often to modify this measuring signal, before it is supplied to a recording or indicating instrument, in such a way that the signal supplied to the instrument is directly linearly proportional to the value of the measured quantity, whereby an instrument with a "linear" scale can be used. In other connections it may be desired to obtain a signal which is a predetermined exponential function of an already existing signal. This is the

case, for instance, in connection with photometric measurements of the concentration of a given substance in a liquid sample. For such a photometric concentration measurement a beam of radiation of a predetermined wavelength is sent through the sample and the intensity of the radiation leaving the sample, the so called transmission, is measured by means of a radiation sensitive element, as for instance a photo diode. However, this measurement result, that is the transmission, is not directly linearly proportional to the concentration of the substance in the sample. Instead it is ***the so called extinction, that is the logarithm of the ratio between the intensity of the radiation leaving the sample and the intensity of the radiation entering the sample, which theoretically is linearly proportional to the concentration in the sample***. However, this is true only in the ideal case, and in reality the non-linear relation between the transmission measured by the radiation sensitive element and the concentration in the sample depends on the substance for which the concentration is measured and also on the wavelength being used. Of course, the relation is also effected by any unlinearity of the radiation sensitive element being used" (i.e. emphasis added, column 1 lines 12-45). This method of calculating an extinction profile by finding a log of a ratio of $I_O(t, r)/ I_T(t, r)$ was known and within the ordinary ability of one of ordinary skill in the art based upon the teachings of Wegstedt.

Therefore it would have been obvious to one of ordinary skill in the art to combine the teachings of Wegstedt with Lerche to obtain the claimed invention and the results would have been predictable.

Regarding **claim 9,** Lerche and Wegstedt teach the limitations of claim 1 as indicated above. Further, Lerche teaches wherein indices for the consolidation behavior of the dispersion samples can be computed from the sediment levels for gradually changed revolutions related to the respective operative centrifugal force (page 1 line 5 to page 2 lines 37 and Fig. 1).

Regarding **claim 10,** Lerche and Wegstedt teach the limitations of claim 1 as indicated above. Further, Lerche teaches wherein the control of the segregation analyser and the measurement sensor, including radiation source, sample management and data transfer, data handling and data storage, as well as all steps of analysis and the documentation of the results, takes place by means of software supported by a database (see LUMiFuge, page 9 and Fig. 1).

Regarding **claim 17,** Lerche and Wegstedt teach the limitations of claim 1 as indicated above. Further, Lerche teaches wherein the physical, technical method and/or colloidal chemistry parameter that is determined is selected from the group consisting of particle size, distribution of particle size, speed distribution, particle flux, hindrance function, index of structural stability and a combination thereof (see "Rohstoffe bezüglich ihrer Partikelanzahl, der Partikelgrüße under der Partikelgrößenverteilung….", page 2 lines 35-37 and Fig. 1 (i.e. particle number, particle size and particle size distribution)).

Regarding **claim 19,** Lerche teaches the limitations of claim 29 as indicated above. Further, Lerche teaches detecting transmission values $I_T(t, r)$ and/or scattering values $I_s(t, r)$ of the sample (see "Danach wird im Durchlicht-Hellfeld der

Leuchtdichteverlauf von Suspension- und Emulsionsproben auf einem Bildaufnehmer abgebildet un rechentechnisch aufbereitet…", page 2 lines 19-30 and Fig. 1 column 1 (i.e. luminance curve of suspension and emulsion sample is imaged onto an image recorder and processed)) and LUMiFuge (see also LUMiFuge, page 9 and Fig. 1 column 1). Lerche differs from the claimed invention in that it may not explicitly teach calculating an extinction profile by finding a log of a ratio of $I_O(t, r)/ I_T(t, r)$.

Wedgstedt "Thus, within the measuring technique, it occurs in many cases that an analog electric measuring signal is produced, which is not directly linearly proportional to the value of the measured quantity. In such a case one wishes often to modify this measuring signal, before it is supplied to a recording or indicating instrument, in such a way that the signal supplied to the instrument is directly linearly proportional to the value of the measured quantity, whereby an instrument with a "linear" scale can be used. In other connections it may be desired to obtain a signal which is a predetermined exponential function of an already existing signal. This is the case, for instance, in connection with photometric measurements of the concentration of a given substance in a liquid sample. For such a photometric concentration measurement a beam of radiation of a predetermined wavelength is sent through the sample and the intensity of the radiation leaving the sample, the so called transmission, is measured by means of a radiation sensitive element, as for instance a photo diode. However, this measurement result, that is the transmission, is not directly linearly proportional to the concentration of the substance in the sample. Instead it is ***the so called extinction, that is the logarithm of the ratio between the intensity of the***

radiation leaving the sample and the intensity of the radiation entering the sample, which theoretically is linearly proportional to the concentration in the sample. However, this is true only in the ideal case, and in reality the non-linear relation between the transmission measured by the radiation sensitive element and the concentration in the sample depends on the substance for which the concentration is measured and also on the wavelength being used. Of course, the relation is also effected by any unlinearity of the radiation sensitive element being used" (i.e. calculating an extinction profile by finding a log of a ratio of $I_O(t, r)/ I_T(t, r)$, emphasis added, column 1 lines 12-45). This method of calculating an extinction profile by finding a log of a ratio of $I_O(t, r)/ I_T(t, r)$ was known and within the ordinary ability of one of ordinary skill in the art based upon the teachings of Wegstedt.

Therefore it would have been obvious to one of ordinary skill in the art to combine the teachings of Wegstedt with Lerche to obtain the claimed invention and the results would have been predictable.

Regarding **claim 20,** Lerche and Wegstedt teach the limitations of claim 19 as indicated above. Further, Lerche teaches varying acceleration, time-dependent position of the specimen and time-dependent changes in acceleration change in the position of the specimen (i.e. calculating multiple extinction profiles and segregation speeds, pages 2-8 and Fig. 1).

Regarding **claim 21,** Lerche and Wegstedt teach the limitations of claim 1 as indicated above. Further, Lerche teaches calculating weighted distributions of the particle or droplet size from a profile for selectable times in relation to an initial profile

(Fig. 1). Lerche differs from the claimed invention in that it may not explicitly teach calculating an extinction profile.

Wedgstedt "Thus, within the measuring technique, it occurs in many cases that an analog electric measuring signal is produced, which is not directly linearly proportional to the value of the measured quantity. In such a case one wishes often to modify this measuring signal, before it is supplied to a recording or indicating instrument, in such a way that the signal supplied to the instrument is directly linearly proportional to the value of the measured quantity, whereby an instrument with a "linear" scale can be used. In other connections it may be desired to obtain a signal which is a predetermined exponential function of an already existing signal. This is the case, for instance, in connection with photometric measurements of the concentration of a given substance in a liquid sample. For such a photometric concentration measurement a beam of radiation of a predetermined wavelength is sent through the sample and the intensity of the radiation leaving the sample, the so called transmission, is measured by means of a radiation sensitive element, as for instance a photo diode. However, this measurement result, that is the transmission, is not directly linearly proportional to the concentration of the substance in the sample. Instead it is ***the so called extinction, that is the logarithm of the ratio between the intensity of the radiation leaving the sample and the intensity of the radiation entering the sample, which theoretically is linearly proportional to the concentration in the sample***. However, this is true only in the ideal case, and in reality the non-linear relation between the transmission measured by the radiation sensitive element and the

concentration in the sample depends on the substance for which the concentration is measured and also on the wavelength being used. Of course, the relation is also effected by any unlinearity of the radiation sensitive element being used" (i.e. emphasis added, column 1 lines 12-45). This method of calculating an extinction profile by finding a log of a ratio of $I_O(t, r)/ I_T(t, r)$ was known and within the ordinary ability of one of ordinary skill in the art based upon the teachings of Wegstedt.

Therefore it would have been obvious to one of ordinary skill in the art to combine the teachings of Wegstedt with Lerche to obtain the claimed invention and the results would have been predictable.

Regarding **claim 22,** Lerche and Wegstedt teach the limitations of claim 1 as indicated above. Further, Lerche teaches calculating cumulative volume-weighted distributions of the particle or droplet size from any extinction profiles acquired at time t according to (b), wherein a volume-specific extinction cross section that is dependent on particle size is determined if the course of the extinction is determined during the segregation of at least one polydisperse substance system with similar optical characteristics (pages 2-9 and Fig. 1; see also LUMiFuge page 9 and Fig. 1).

Regarding **claim 23,** Lerche and Wegstedt teach the limitations of claim 22 as indicated above. Further, Lerche teaches using the volume-weighted distribution of particle or droplet sizes determined in (f) and a particle size dependency for the volume-specific extinction cross section determined in step (f)(3), assigning each radial position and the particle size associated with it a volume concentration (pages 2-9 and Fig. 1; see also LUMiFuge page 9 and Fig. 1).

Regarding **claim 24,** Lerche and Wegstedt teach the limitations of claim 1 as indicated above. Further, Lerche teaches determining a flux density function standardized to a centrifugation constant from a change in the concentration of the sample with a known starting concentration (pages 2-9 and Fig. 1; see also LUMiFuge page 9 and Fig. 1).

Regarding **claim 25,** Lerche and Wegstedt teach the limitations of claim 1 as indicated above. Further, Lerche teaches determining a concentration-dependent hindrance function for the sample (pages 2-9 and Fig. 1; see also LUMiFuge page 9 and Fig. 1).

Regarding claim 4, Lerche and Wegstedt teach the limitations of claim 25 as indicated above. Further, Lerche teaches calculating an apparent relative viscosity as a function of concentration by volume from the concentration-dependant hindrance function, taking into account the concentration by volume (pages 2-9 and Fig. 1; see also LUMiFuge page 9 and Fig. 1).

Regarding **claim 28,** Lerche and Wegstedt teach the limitations of claim 1 as indicated above. Further, Lerche teaches the polydispersity index is characteristic for the polydispersity of the density or a particle or droplet size (see LUMiFuge, page 9 and Fig. 1 column 1(i.e. LUMiFuge calculate a polydispersity index); see also pages 2-9 and Fig. 1).

10. **Claims 26** are rejected under 35 U.S.C. 103(a) as being unpatentable over Lerche in WO 97/16713 A2 (see machine translation of corresponding patent family document DE 19542225 A1 for understanding) and Wegstedt in US Patent 3,997,845

as applied to claim 1 above, and further in view of Onyuksel et al. in US Publication 2005/0025819.

Regarding **claim 26,** Lerche and Wegstedt teach the limitations of claim 1 as indicated above. Further, Lerche teaches LUMiFuge (page 9 and Fig. 1 column 1) and the particle or droplet sizes and their distribution are determined (see "Rohstoffe bezüglich ihrer Partikelanzahl, der Partikelgrüβe under der Partikelgrößenverteilung….", page 2 lines 35-37 and Fig. 1 (i.e. particle number, particle size and particle size distribution)).

Lerche and Wegstedt differ from the claimed invention in that they may not explicitly teach determining a volume-weighted distribution of the Stoke equivalent diameter if the allowance for a hydrodyamic impediment is provided by a mathematical algorithm.

Onyuksel et al. teaches methods for the delivery of compounds that are insoluble or nearly insoluble in an aqueous solution ([0001]) wherein the sample is prepared using centrifugation ([0168] and [0214]-[0215]). Further, particle size distribution and mean diameter of the prepared aqueous dispersions by quasi-elastic light scattering and the mean hydrodynamic particle diameter is obtained from the Stokes-Einstein relation using the measured diffusion of particles in the solution (i.e. determining a volume-weighted distribution of the Stoke equivalent diameter if the allowance for a hydrodyamic impediment is provided by a mathematical algorithm, [0216]). This method of determining a volume-weighted distribution of the Stoke equivalent diameter if the allowance for a hydrodyamic impediment is provided by a mathematical algorithm

was within the ordinary ability of one of ordinary skill in the art based upon the teaches of Onyuksel et al.

Therefore it would have been obvious to one of ordinary skill in the art to combine the teachings of Onyuksel et al. with Lerche and Wegstadt to obtain the claimed invention and the results would have been predictable.

Conclusion

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

PS Prozesstechnik in NPL teaches the LUMiFuge working principle.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to MI'SCHITA' HENSON whose telephone number is (571)270-3944. The examiner can normally be reached on Monday - Thursday 7:30 a.m. - 4:00 p.m. EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner’s supervisor, Drew Dunn can be reached on (571) 272-2312. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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